WEATHER, FORECASTS, AND WARNINGS FOR THE MONTH.

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A period of exceptionally warm, dry weather that had continued generally over the United States through March and the first half of April was ended about the middle of the month, when temperature fell below the average for the season over the Plains States and middle and southern Rocky Mountain districts, and general precipitation set in from the Mississippi Valley eastward, except in New England. In southern portions of the Middle Atlantic States and the interior of the South Atlantic States and thence to the middle Missouri Valley the precipitation was heavy. During the first half of the third decade of the month temperature was abnormally low in the central valleys and Lake region, but continued high from the Rockies to the Pacific coast and in the Middle and North Atlantic States. During the 24th and 25th the line of freezing temperature extended almost to the Gulf coast, and snow fell in the interior of the middle and east Gulf and South Atlantic States. Although timely warnings of frost and freezing temperatures were issued for all sections visited by the cool wave great damage was caused by low temperatures throughout the central valleys and the Southern States. In Middle Eastern and Northeastern States damaging temperatures were not experienced. During the period of exceptional cold weather in the central valleys and the Southern States a warm wave advanced from the western and northwestern sections, attended by temperatures above 90° and reached the Atlantic seaboard April 30. With the arrival of this warm wave the two-week period of unsettled, rainy weather in the East ended and the month closed with fair weather and seasonable temperature over the western half of the country.

The general distribution of atmospheric pressure over the Northern Hemisphere during the closing days of March indicated a decided change from the mild, fair weather that had for several weeks prevailed in the United States. In a forecast issued March 27 the statement was made that the rains of the following week would increase in area and be followed by changes to colder weather.

April opened with a barometric disturbances in extreme Northwest and Southwest portions of the United States that, during the succeeding two days, advanced eastward over the Plains States, attended by rains over considerable areas from the Rocky Mountains eastward.

On April 3 the following special forecast was issued:

During the present week the weather over the British Isles and northern and western Europe and adjacent waters will be cool and unsettled. Along the transatlantic steamer routes fog will be prevalent from the Grand Banks westward Tuesday and Wednesday, after which the winds will shift to north west and increase in force. East of the 40th meridian winds will be northerly until about the middle of the week, when they will shift to increasing southerly and then go to northerly in squalls.

In the United States the rains of the week will be more general than those of the past several weeks. During the first half of the week an extensive barometric depression will cross the central valleys, Lake region, and Atlantic seaboard attended by rains that will alleviate prevailing conditions of drought in those regions. The rain area will be followed by a sharp fall in temperature that will carry the frost line to or somewhat below the fortieth parallel. Another disturbance that promises to be attended by general rains will appear on the Pacific coast about Tuesday and advance over the Plains States, central valleys, Lake region, and Atlantic States during the latter half of the week.

By the morning of April 4 the barometric disturbance referred to extended in a trough of low pressure from western Lake Superior to Texas, rains had been general over the eastern half of the country, except in New England and the Southeast, and in the Northwest and middle and northern Rocky Mountain districts rains and snows had been attended by a decided fall in temperature. During the next 24 hours the disturbance drifted slowly eastward over the Mississippi Valley, attended by showers and thunderstorms in the central valleys and Lake region, by rains in the Middle Atlantic and New England States, and followed by a decided fall in temperature in the Plains States and Missouri and Mississippi valleys. On the morning of the 5th the line of freezing temperature was traced from New Mexico to Minnesota. On the 5th (Tuesday) a barometric disturbance appeared on the north Pacific coast and fog prevailed along and off the middle Atlantic and southern New England coasts. During the succeeding 24 hours the center of disturbance moved to estern Ontario and rains that were heavy in localities fell from the middle and upper Mississippi Valley over the Ohio Valley and Lake region. Rains also occurred in the South Atlantic and east Gulf States. Temperature fell decidedly in the central valleys and Lake region with freezing weather from the Dakotas over the upper Mississippi Valley and northwestern Lake region, and killing frost was reported in southeastern Kansas. The north Pacific coast disturbance moved over the northern Rocky Mountain districts and rain fell in the north Pacific coast States. Fog was again reported along the north Atlantic coast and doubtless extended in areas thence to the Grand Banks. By Thursday morning the storm center had advanced over New England, precipitation had extended over the Middle Atlantic and New England States. with snow in the more northern districts, and the line of freezing temperature crossed the Lake region with frost in the Ohio Valley and Tennessee. The occurrence of frost in the regions named was forecast the morning of the 6th. Under the influence of the disturbance from the north Pacific coast, that had advanced over the Plains States, temperature had risen from the Mississippi River to the Rocky Mountains.

As indicated in the special forecast of the 3d instant the weather along the transatlantic steamship tracks and western Europe had become unsettled and a disturbance from the American Continent had reached mid-ocean with another disturbance moving eastward off the north Atlantic coast. With high barometric pressure over the Iceland area and low barometer in the Azores regions the advance of storms over the Atlantic in middle latitudes was indicated and on the morning of the 7th the following was cabled to Lloyds, London:

Stormy weather along transatlantic tracks and western European coasts next several days.

On the morning of April 8 the northeastern disturbance persisted on the New England coast, and snow and rain continued in New England and the interior of New York. The line of freezing temperature had extended over the mountain districts of the Middle Atlantic States, and frost occurred as far south as Tennessee and Virginia. The northwestern disturbance existed as a trough of low pressure that extended from western Lake Superior to Texas, and temperature had risen in the central valleys. The mid-Atlantic storm had increased in intensity, with barometer 29.36 inches and wind velocity 64 miles an hour from the southwest at Horta, Azores. The week closed with temperature above the average for the season generally over the interior of the United States and showers in Northeastern, Southwestern, and extreme Northwestern States.

The following special bulletin and forecast was issued Sunday, April 10:

A storm of marked intensity extends from the Azores northward over the transatlantic steamer routes. Over the British Isles and west-central continental Europe the weather is fair and cool. Over the balance of Europe low barometric pressure is attended by unsettled weather. Temperature will be higher generally over Europe during the present week with rain in northern, northwestern, and eastern and fair weather in south-central countries. Over the Siberian area the weather will be fair over eastern and unsettled in western portions. There are at present no signs of storms of

marked intensity in middle and southern latitudes of the Pacific Ocean. In northern latitudes of the Pacific the storms promise to be of moderate strength only. Temperature is above normal generally throughout the United States and fair weather prevails, except in the North Pacific States and Texas.

During the present week temperature will average above normal generally in the United States and from the central valleys eastward the week, as a whole, will be unusually warm. During the first 3 days of the week a disturbance attended by scattered showers will advance from the central valleys over the Atlantic States. A disturbance that will occupy the Pacific States Monday will advance over the Plains States and central valleys during the middle days of the week and reach the Atlantic coast near the close of the week. The latter disturbance should be attended by an extensive area of showers and followed by a sharp fall in temperature that will produce frost in the more northern States.

During the 11th and 12th the mid-Atlantic storm advanced over the British Isles and stormy weather set in over northern and western Europe. In the United States a disturbance advanced from the Plains States over the Mississippi Valley, attended by rains from New England southwestward over the Middle Atlantic States and Ohio Valley and Gulf States, and from the upper Mississippi Valley over the Lake region rain or snow preceded clearing, cooler weather. A disturbance, with rain, that occupied the Pacific States Monday moved over the Plateau and Rocky Mountain districts by Tuesday morning. By the 13th the eastern Atlantic storm had deepened with barometer 29.06 inches in the morning at Valentia, Ireland, and stormy weather prevailed over the British Isles, western continental Europe, and the North Sea. The Mississippi Valley disturbance had advanced to the south Atlantic coast with rain from the Ohio Valley and Virginia southward, and the western disturbance had moved over the Plains States, with rains in the Rocky Mountain districts and a marked rise in temperature in the Lake region and the Western States. On this date a barometric depression was noted over the Japan Sea, the barometer rose over the eastern portion of Bering Sea, fell decidedly over southern and eastern Alaska, and an area of high barometer appeared over the North Pacific States. Reports of the 14th showed the center of the European storm near the east coast of Scotland, with reported pressure, 28.96 inches, at Sumburgh Head. The North American disturbance covered the Missouri Valley and Plains States, and was attended by rain, thence eastward over the Mississippi Valley. This disturbance was followed by an area of high barometer that carried the line of freezing temperature over the middle Plateau and middle Rocky Mountain districts. On this date a rapid decrease in pressure was shown over the Siberian area, and the depression noted over the Japan Sea on the 13th had apparently moved northeastward over the Pacific. During the 16th and 17th the north-central American disturbance persisted over the Lake region and upper Mississippi Valley, heavy rains fell from the central valleys over the Middle and South Atlantic and Gulf States and freezing temperature and snow extended over the middle Mississippi Valley.

On the 17th the following special bulletin was issued:

After a week of stormy weather fair weather has set in over the British Isles and west-central and northwestern continental Europe and adjacent waters and storms are not indicated for the European area during the next several days, except on the northwest coasts where a disturbance will appear by the middle of the week. Over the Atlantic Ocean the weather will be fair and settled over southern latitudes and moderate gales will be encountered along and north of the transatlantic steamer routes. Over eastern Siberia and along the middle-eastern and northern Asiatic coasts marked barometric changes will be attended by unsettled weather. Over the Pacific Ocean fair weather will prevail in southern latitudes and disturbances of moderate strength will be encountered along the great circle sailing route.

In the United States the week will open with abnormally low temperature from the Rocky Mountains eastward, with frost as far south as the lower Ohio Valley and Tennessee and snow in the Lake region. The first half of the week will be fair in the Southern States and unsettled from the north-central valleys eastward. A barometric depression that will appear over the extreme Western States Monday will advance over the Rockies and Plains States Tuesday, cross the central valleys and Lake region Wednesday and Thursday, and reach the Atlantic seaboard near the close of the week. This disturbance will be preceded by rising temperature and attended by showers that will extend southward over the Gulf and South Atlantic States.

The bulletin also contained the following note regarding frost and frost protection:

The prevailing mild weather of the present season has resulted in trees making an unusual advance toward fruition and thereby increasing the likelihood of damage to the fruit crop. With proper precautionary measures damage by frost may, as a rule, be averted and damage by freezes minimized. There is no section of the country where fruit crops in their seasons of bloom and ripening are not subject to damage by frost, and there is no section in which successful growers have not been amply repaid for labor and material expended to save their crops from injury or destruction by frosts and freezes. In 1909 $3,000,000 to $4,000,000 worth of fruit was saved in Colorado alone by orchard heating, crude oil burned in pots being the fuel mostly employed. Weather Bureau advices regarding impending frost should prompt the grower to get his firing material ready for use in the orchard, and the material and apparatus should measure up to the necessity of keeping the temperature about the trees above freezing until the temperature of the surrounding air again rises above the danger point.

Precipitation continued in middle and northern districts east of the Mississippi during the 18th and 19th and on the morning of the latter date snow and freezing temperatures were reported in the Ohio Valley. Over the extreme West pressure fell and a general rise in temperature occurred as far east as the Mississippi Valley. The rains of the middle days of the month in the central valleys and later in the Atlantic States relieved the severe drought that had prevailed during March and the early part of April. Unsettled weather and rains continued in the Middle Eastern States until the 21st, and the frost line extended over Tennessee and adjoining portions of the Gulf States. During the passage of this cool wave serious injury was caused to fruit in middle sections of the country from the Plateau region eastward over the central valleys. Reports from Salt Lake City, Utah, show that, while great damage to fruit was caused in that section, the loss was comparatively light in large orchards where smudge fires were burning. A barometric depression that appeared over the extreme West during the opening days of the week advanced over the central valleys and western lakes Thursday and Friday and moved thence slowly eastward over the eastern Lake region, Ohio Valley, and Middle and South Atlantic States during Saturday and Sunday, attended by general precipitation from the middle and upper Mississippi Valley eastward. In the western Lake region and middle and upper Mississippi and middle and lower Ohio valleys the precipitation was partly in the form of snow. The disturbance was followed by a decided fall in temperature that carried the line of freezing weather and snow as far south as the interior of the east Gulf States.

The following special forecast was issued April 24:

A disturbance of marked intensity covers northwestern Europe with gales on the British coasts and over the North Sea. Over southern and eastern continental Europe and generally over the Asiatic area the weather is fair. Stormy weather is indicated for Europe, except in southern portions, during the next several days. Over the British Isles west to northwest gales will diminish in force and rain will be followed by clearing, colder weather by the middle of the week. Over the Atlantic east of the 30th meridian northwest gales will be followed by winds becoming light and variable. Between the 30th and 50th meridians fair weather will continue during the next two or three days. West of the 50th meridian the weather will continue unsettled with squalls for several days. Fair weather is indicated for middle and southern latitudes of the Pacific. North of the 40th parallel the weather promises to be settled, except off the American coasts where the barometric disturbances will appear about Monday and Friday.

In the United States the week will open with low temperature from the Mississippi Valley to the Atlantic coast and abnormally high temperature from the Plains States over the Rocky Mountain districts. From the Lake region and Ohio Valley over the Middle Atlantic and New England States there will be precipitation in the form of rain or snow. In the Southern States fair weather, with rising temperature, will continue until about the close of the week, when showers will occur in the Gulf States. Over Middle Eastern and Northeastern States and thence over the Ohio Valley and Lake region temperature will be abnormally high during the latter half of the week, with fair weather during the middle days of the week and showers Friday and Saturday.

Following the low temperature of the opening of the week over the eastern half of the country, with snow in the interior

of the Gulf States and frost to the northern Florida line temperature rose in the Southern States and fair weather set in Monday. In the Northwest temperature rose above 90° and reached a maximum of 94° at Havre, Mont., Tuesday. In middle-eastern and northeastern districts unsettled weather continued until the 27th. On that date an area of high barometer that had persistently occupied the western Atlantic began to give way, and by the morning of the 28th the barometric depression that had covered the eastern portion of the United States for about 10 days passed over the Atlantic, and a period of precipitation that began on the 16th ended. The western warm wave extended during the 27th over the Plains States and showers occurred in the middle and northern Plateau and northern Rocky Mountain districts and southern California. A barometric depression that appeared on the north Pacific coast on the 25th and advanced thence over the northern Rockies during the next two days, appeared on the morning of the 28th as an extensive disturbance that covered the Plains States and Rocky Mountain and Plateau regions. During the 28th the western warm wave advanced over the Missouri and Mississippi valleys with a reported maximum of 98° at Sioux City, Iowa, and showers over the middle-west and the eastern Lake region. Moving eastward over the Lake region by the night of the 29th the western disturbance advanced over the St. Lawrence Valley during the 30th, attended by showers from the Great Lakes over the Middle Atlantic and New England States. During the 29th temperatures rose above 90° in the Mississippi Valley, and on the 30th the highest temperatures of the season were registered in portions of the Middle Atlantic States with a reported maximum of 92° at Washington, D. C.

Average temperatures and departures from the normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	12	48.2	+ 4.6	+14.4	+ 3.8
Middle Atlantic	15	54.6	+ 4.1	+13.0	+ 3.2
South Atlantic	10	62.9	+ 1.6	+ 5.8	+ 1.4
Florida Peninsula*	8	69.1	− 1.1	− 1.1	− 0.3
East Gulf	11	63.6	− 1.1	+ 3.3	+ 0.8
West Gulf	10	64.7	− 0.8	+ 5.8	+ 1.4
Ohio Valley and Tennessee	13	55.4	+ 0.4	+ 8.0	+ 2.0
Lower Lakes	10	48.7	+ 4.0	+12.7	+ 3.2
Upper Lakes	12	45.1	+ 4.7	+17.2	+ 4.3
North Dakota*	9	47.4	+ 6.7	+26.1	+ 6.5
Upper Mississippi Valley	14	52.6	+ 2.2	+14.5	+ 3.6
Missouri Valley	12	54.1	+ 3.7	+20.9	+ 5.2
Northern slope	9	50.2	+ 7.4	+19.1	+ 4.8
Middle slope	6	56.5	+ 2.8	+17.1	+ 4.3
Southern slope*	8	62.6	+ 1.0	+ 9.5	+ 2.4
Southern Plateau*	11	59.6	+ 2.4	+ 7.3	+ 1.8
Middle Plateau*	10	51.1	+ 3.9	+ 4.8	+ 1.2
Northern Plateau*	10	52.7	+ 5.2	+ 7.7	+ 1.9
North Pacific	7	48.9	+ 0.5	+ 1.2	+ 0.3
Middle Pacific	5	57.9	+ 2.5	+ 0.2	0.0
South Pacific	4	62.2	+ 4.2	+ 6.2	+ 1.6

*Regular Weather Bureau and selected cooperative stations.

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	76	+ 3	Missouri Valley	55	−10
Middle Atlantic	70	+ 3	Northern slope	54	− 4
South Atlantic	70	− 2	Middle slope	50	− 7
Florida Peninsula	68	− 6	Southern slope	47	− 8
East Gulf	66	− 4	Southern Plateau	38	+ 8
West Gulf	67	− 5	Middle Plateau	42	− 3
Ohio Valley and Tennessee	66	+ 1	Northern Plateau	51	− 6
Lower Lakes	72	+ 2	North Pacific	77	+ 6
Upper Lakes	76	+ 3	Middle Pacific	71	− 1
North Dakota	63	− 5	South Pacific	66	− 2
Upper Mississippi Valley	68	0			

Average precipitation and departures from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	11	2.69	87	− 0.4	− 0.8
Middle Atlantic	15	4.64	153	+ 1.6	− 0.8
South Atlantic	11	1.73	50	− 1.7	− 6.5
Florida Peninsula*	8	0.96	41	− 1.4	− 4.0
East Gulf	11	2.40	60	− 1.6	− 7.2
West Gulf	10	2.74	77	− 0.8	− 4.1
Ohio Valley and Tennessee	13	3.62	100	0.0	− 1.5
Lower Lakes	10	3.48	146	+ 1.1	+ 1.3
Upper Lakes	12	3.28	144	+ 1.0	− 1.5
North Dakota*	9	1.61	100	0.0	− 0.6
Upper Mississippi Valley	15	2.91	100	0.0	− 2.6
Missouri Valley	12	1.15	39	− 1.8	− 3.2
Northern slope	9	0.88	56	− 0.7	− 0.8
Middle slope	6	1.43	70	− 0.6	− 2.3
Southern slope*	8	2.20	96	− 0.1	− 2.2
Southern Plateau*	11	0.47	82	− 0.1	− 1.3
Middle Plateau*	11	0.42	34	− 0.8	− 3.0
Northern Plateau*	10	1.23	64	− 0.7	− 1.7
North Pacific	7	2.85	88	− 0.4	− 1.7
Middle Pacific	7	0.39	19	− 1.7	− 4.7
South Pacific	4	0.22	22	− 0.8	− 4.3

*Regular Weather Bureau and selected cooperative stations.

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Buffalo, N. Y.	30	52	sw.	Mount Weather, Va.	9	52	nw.
Burlington, Vt.	30	56	s.	North Head, Wash.	2	52	w.
Cairo, Ill.	5	51	sw.	Do.	7	58	se.
Do.	14	54	sw.	Do.	12	54	se.
Chattanooga, Tenn.	15	55	nw.	North Platte, Nebr.	21	52	nw.
Cheyenne, Wyo.	16	50	nw.	Oklahoma, Okla.	13	67	w.
Denver, Colo.	14	52	nw.	Pensacola, Fla.	15	50	se.
Detroit, Mich.	5	52	sw.	Do.	16	54	s.
Devils Lake, N. Dak.	17	50	n.	Do.	24	56	sw.
Dodge City, Kans.	13	51	se.	Point Reyes Light, Cal.	6	50	nw.
Erie, Pa.	17	52	sw.	Do.	10	62	s.
Fort Smith, Ark.	14	56	sw.	Do.	12	74	nw.
Green Bay, Wis.	23	56	n.	Do.	13	79	nw.
Kansas City, Mo.	23	56	nw.	Do.	14	57	nw.
Lewiston, Idaho.	5	52	w.	Do.	20	54	nw.
Lincoln, Nebr.	23	56	n.	Do.	25	52	nw.
Memphis, Tenn.	15	52	sw.	Do.	26	60	nw.
Minneapolis, Minn.	23	52	n.	Salt Lake City, Utah.	2	60	n.
Mount Tamalpais, Cal.	1	58	nw.	Sheridan, Wyo.	3	50	nw.
Do.	12	54	nw.	Sioux City, Iowa.	23	65	n.
Do.	13	58	nw.	Southeast Farallon, Cal.	12	56	nw.
Do.	14	57	nw.	Do.	13	54	n.
Do.	25	67	nw.	Toledo, Ohio.	5	56	sw.
Do.	28	72	nw.	Do.	16	50	sw.
Do.	29	58	nw.	Tonopah, Nev.	3	56	nw.
Do.	30	62	nw.	Wichita, Kans.	13	54	se.
Mount Weather, Va.	6	58	w.	Williston, N. Dak.	3	50	n.
Do.	7	54	nw.				

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	5.9	+ 0.4	Missouri Valley	4.6	− 1.0
Middle Atlantic	5.4	+ 0.2	Northern slope	4.4	− 0.7
South Atlantic	4.3	− 0.3	Middle slope	4.0	− 0.6
Florida Peninsula	3.2	− 0.6	Southern slope	3.4	− 1.3
East Gulf	4.6	− 0.3	Southern Plateau	2.7	− 0.1
West Gulf	4.2	− 0.9	Middle Plateau	4.0	− 0.5
Ohio Valley and Tennessee	6.0	+ 0.7	Northern Plateau	5.4	+ 0.2
Lower Lakes	5.9	+ 0.2	North Pacific	6.1	− 0.1
Upper Lakes	6.0	+ 0.5	Middle Pacific	4.3	− 0.1
North Dakota	4.2	− 1.1	South Pacific	3.4	− 0.6
Upper Mississippi Valley	5.6	+ 0.4			